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التاريـــخ: / /

نموذج رقم (18)
اقرار والتزام بالمعايير الأخلاقية والأمانة العلمية
وقوانين الجامعة الأردنية وأنظمتها وتعليماتها
لطلبة الماجستير

أنا الطالب: أوديت كامل ابراهيم تادرس الرقم الجامعي: (٨٠٦٢٠٥٨)
تخصص: _الصيدلة السريرية_ الكليـــــــة: الصيدلة_

عنوان الرسالة:

Comprehensive Pharmaceutical Care Program For Patients Taking Multiple Medications At Community Pharmacy Settings

اعلن بأنني قد التزمت بقوانين الجامعة الأردنية وأنظمتها وتعليماتها وقراراتها السارية المفعول المتعلقة باعداد رسائل الماجستير عندما قمت شخصيا" باعداد رسالتي وذلك بما ينسجم مع الأمانة العلمية وكافة المعايير الأخلاقية المتعارف عليها في كتابة الرسائل العلمية. كما أنني أعلن بأن رسالتي هذه غير منقولة أو مستلة من رسائل أو كتب أو أبحاث أو أي منشورات علمية تم نشرها أو تخزينها في أي وسيلة اعلامية، وتأسيسا" على ما تقدم فانني أتحمل المسؤولية بأنواعها كافة فيما لو تبين غير ذلك بما فيه حق مجلس العمداء في الجامعة الأردنية بالغاء قرار منحي الدرجة العلمية التي حصلت عليها وسحب شهادة التخرج مني بعد صدورها دون أن يكون لي أي حق في التظلم أو الاعتراض أو الطعن بأي صورة كانت في القرار الصادر عن مجلس العمداء بهذا الصدد.

توقيع الطالب:.. التاريخ: ١٣ / ٥ / ٢٠١١

COMPREHENSIVE PHARMACEUTICAL CARE PROGRAM FOR PATIENTS TAKING MULTIPLE MEDICATIONS AT COMMUNITY PHARMACY SETTINGS

BY:

Odate Kamel I. Tadros

SUPERVISOR:

Dr. Salah M. AbuRuz

This Thesis was Submitted in Partial Fulfilment of the Requirements for the

Master's Degree of Clinical pharmacy

Faculty of Graduate Studies

The University of Jordan

May 2011

COMMITTEE DECISION

This Thesis/Dissertation (Comprehensive Pharmaceutical Care Program For Patients Taking Multiple Medications At Community Pharmacy Settings) was Successfully Defended and Approved on 2/5/2011

<u>**Examination Committee**</u>	<u>**Signature**</u>
Dr Salah M. AbuRuz (Supervisor) Assoc. Prof. of Clinical Pharmacy and Therapeutics	
Dr Naela R Bulatova (Member) Assoc. Prof. of Pharmacology	
Dr Mutasim Al-Ghazawi (Member) Assoc. Prof. of Pharmacokinetics and Pharmaceutical Statistics	
Dr Sayer Al-Azzam (Member) Assoc. Prof. of Clinical Pharmacy (Jordan University of Science and Technology)	

DEDICATION

To My Husband Jeries Tadros

My Daughters Eugenie & Katrina

My Mother Lina

My Sister & Brother

My Family in Law

Without their Guidance, Love, Support And Patience I would never be able to finish this thesis

&

To Dr. Salah Abu Ruz

Acknowledgment

All the thanks to God for his Help…..

Thanks for my supervisor Dr. Salah AbuRuz for his invaluable vision, guidance and help. Without his advice and interest I could not finish this thesis.

My thanks are also to the examination committee members for their efforts in reading, and discussing this thesis; Dr Naela R Bulatova, Dr Mutasim Al-Ghazawi And Dr Sayer Al-Azzam.

To my dear friends and colleagues who helped me through this thesis

I would like to present my deepest gratitude to my family; my husband and daughters for encouragement & every thing they made so that I can achieve the best.

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Abbreviation list

Abbreviation	Meaning
TRP	Treatment Related Problem
IOM	Institute Of Medicine
ADR	Adverse Drug Reaction
ER	Emergency Room
SF	Short Form
SD	Standard Deviation
CVD	Cardio Vascular Disease
NSAID	Non-Steroidal Anti-Inflammatory Drug
HCTZ	Hydrochlorothiazide
K+ level	Potassium level
HbA1c	glycosylated haemoglobin
PCP	Pharmacist Care Plan
NA	Not Applicable
SOAP	Subjective, Objective, Assessment, Plan

COMPREHENSIVE PHARMACEUTICAL CARE PROGRAM FOR PATIENTS TAKING MULTIPLE MEDICATIONS AT COMMUNITY PHARMACY SETTINGS

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Abstract

Community pharmacy is an easily accessible but not controllable source of medications. As medication experts, community pharmacists provide counseling on the treatment of a variety of health related concerns (improve quality of life and prevention of morbidities) and reduce overall costs by helping to ensure that patients consistently take their medications. Pharmacists should have a great role in labeling, reporting and preventing TRPs.

Inappropriate use of medications is often a common problem that is rarely evaluated and controlled in community pharmacies. Few studies have been conducted in Jordan to assess the role of clinical pharmacists in the In-patients and Out-patients settings with results supporting the role of clinical pharmacists in reducing TRPs and improving disease control and quality of life for patients.

The primary aim of this study is to investigate the impact of providing pharmaceutical care in community pharmacy patients by clinical pharmacist. It also aims to investigate physicians' acceptance and the patients' responses to the recommendations made by clinical pharmacist.

During the study period 160 patients were recruited and randomized into intervention (82) and control (78) groups. All patients were followed up for an average of 3.39 month. The study was carried out at 2 community pharmacies in Jordan.

Most patients had TRPs with a mean of 5.37 TRPs and an average of 3.56 medical conditions per patient.

"In-appropriate adherence", "additional/combination therapy required", "the need for additional monitoring" and "In-appropriate knowledge" were the most common TRPs in the current study.

66.6% of the pharmacist recommendations for the intervention group were submitted to the

physicians. The physicians' acceptance rate was very high 94.1%, but only 74.1% of the accepted recommendations were actually implemented.

Importantly, most of the patients were very satisfied or satisfied from clinical pharmacist services and none were unsatisfied and this is an important finding.

1. INTRODUCTION

1.1 Background

Community pharmacies are an easily accessible but not controllable source of medications, they not only represent a significant portion of the health care delivery system, but independent community pharmacists are also among the most accessible and trusted sources of health care for many patients. As medication experts, independent community pharmacists provide counselling on the treatment of a variety of health related concerns and reduce overall costs and complications of pharmacotherapy by helping to ensure that patients consistently take their medications and by referring them to generic treatment options when they are available.

Despite medical evidence supporting the use of medications for a variety of chronic diseases, inappropriate use of medications is often a common problem that is rarely evaluated and controlled in community pharmacies.

Treatment related problems (TRPs) have been connected with inconvenience, pain, suffering, and even death. In addition, there is a huge financial burden associated with these problems. Pharmacists should have a greater role in labelling, reporting and preventing those problems.

According to Brown *et al.* (2006); expenditures on outpatient prescription drugs increased by 18.8% from $111.1 to $131.9 billion from 1999 to 2000. Medicaid spending on

prescription drugs even tripled from $4.8 to $17 billion from 1990 to 1999. Although these statistics show a considerable growth in the use of medications in the outpatient setting, research on prescription medication safety within community care is lacking.

Given that appropriate use of certain types of pharmacotherapy may prevent the onset of new diseases and disease complications, reduce disease severity, improve quality of life and reduce healthcare costs; it is important to establish pharmaceutical care services in the community pharmacies in order to ensure appropriate medication use (Nietert *et al.,* 2009).

Unlike the inpatient setting, in which the prescription and distribution of medication is more controlled, in the community setting the patient becomes increasingly responsible for medication adherence, monitoring, and reporting. What remains unexamined in the community care literature is the pharmacist's role as the interceptor, detector, and reporter of TRPs to the physician.

Few studies have been conducted in Jordan to assess the role of clinical pharmacists in the in-patients and out-patients settings with results supporting the role of clinical pharmacists in reducing TRPs and improving disease control and quality of life for patients.

In Jordan, pharmaceutical care is still not well implemented in community pharmacy settings and the value of this service is still not well known.

The primary aim of this study is to investigate the impact of providing pharmaceutical care in community pharmacy patients by clinical pharmacist.

1.2 Pharmaceutical Care and treatment related problems: definitions and principles of practice

1.2.1 Pharmaceutical Care

The term 'pharmaceutical care' to replace clinical pharmacy was introduced by Brodie *et al.,* in 1980, when they suggested a complete change in the delivery of pharmaceutical services (Brodie *et al.*, 1980). Hepler & Strand further developed those concepts in 1989, they provided the now widely accepted definition of 'pharmaceutical care' as 'the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life (Hepler and Strand, 1990). The authors suggested that pharmaceutical care 'involves the process through which a pharmacist cooperates with a patient and other health professionals in designing, implementing and monitoring a therapeutic plan that will produce specific therapeutic outcomes for the patient. This concept of the role of a pharmacist was presented as a revolutionary strategy to make pharmacists responsible for the outcomes of drug therapy; that is to refocus clinical pharmacy activity from process to outcomes.

It is the goal of pharmaceutical care to improve an individual patient's quality of life through achievement of definite, treatment-related therapeutic outcomes (American Society of Hospital Pharmacists, 1993).

The outcomes sought are

1. Cure of a patient's disease.
2. Elimination or reduction of a patient's symptomatology.
3. Arresting or slowing of a disease process.

4. Prevention of a disease or symptomatology.

This, in turn, involves three major functions: (American Society of Hospital Pharmacists, 1993):

(1) Identifying potential and actual treatment-related problems,

(2) Resolving actual treatment-related problems, and

(3) Preventing potential treatment-related problems.

1.2.2 Treatment related problems

A treatment-related problem is an event or circumstance involving medication therapy that actually or potentially interferes with an optimum outcome for a specific patient.

The 1999 Institute of Medicine's (IOM) report on medical errors, To Err Is Human, thrust into the spotlight numerous inadequacies of the American health care system (National Academy of Sciences, Institute of Medicine, 1999). The IOM specifically identified medication errors as a major subcategory of all medical errors. Treatment related problems have a variety of different forms, ranging from adverse effects and interactions to ineffectiveness, inappropriate use, counterfeiting, dependence and poisoning.

It has been suggested that up to 11.4% of hospital admissions (Prince *et al.,* 1992; Hallas *et al.,* 1992; Pirmohamed *et al.,* 1998) are related to the patient's drug therapy and that if corrected at the dispensing stage would save considerable primary care costs (Schneider and Gift., 1996). An analysis of ADRs rates from 49 hospitals published in 36 articles stated that ADRs were responsible for 0.2–21.7% of hospital admissions (Einarson, 1993). Overall, 71.5% of these were related to side effects, 16.8% were excessive effects, 11.3% were hypersensitivity reactions and 0.4% idiosyncratic. Neville *et al.* (1989) from General

Practitioner Survey stated that 1.06% of prescriptions had therapeutic errors, but this may now be greater due to the inadequate control of a computerized repeat prescribing system (Zermansky, 1996).

Problems associated with the use of medications comprise a broad set of clinical situations and can result in significant drug-related morbidity and mortality. Substantial costs are associated with TRPs, as highlighted by a study from the USA which estimated the economic burden arising from drug related morbidity and mortality to range between £17.3 billion and £75 billion annually (Johnson and Bootman, 1995).

1.2.3 Steps of Pharmaceutical Care

A standardized method for the provision of pharmaceutical care should include the following:

- Step 1: The clinical pharmacist should interview patients to assess their understanding of disease states and their current medication regimen and to collect and organize patient specific information.

- Step 2: The clinical pharmacist should analyse patient's data to determine the presence of treatment related problems.

- Step 3: The clinical pharmacist should help in designing a pharmacotherapeutic regimen and a monitoring plan depending on the patient health care needs and treatment related problems.

- Step 4: The clinical pharmacist should help in monitoring the effects of the pharmacotherapeutic regimen, and redesigning the pharmacotherapeutic regimen and monitoring plan.

- Step 5: The clinical pharmacist should document provision of pharmaceutical care in the patient health record in accordance with pharmacy policies and procedures.

2. LITERATURE REVIEW

According to Hughes *et al.* (2005), large studies have found that the majority of TRPs (49% to 56%) originate when physicians prescribe or order medications. Nurses and pharmacists are responsible for TRPs involving administration (26% to 34%), dispensing (14%), and transcription (11%).

Patients themselves are sometimes the cause of a TRP; for example, when they fail to take a medication as prescribed or when they take too much or too little medication.

Traditionally, TRPs have been attributed to mistakes by individual clinicians (physicians, nurses, pharmacists) or by patients (Hughes *et al.,* 2005).

Pharmacists possess unique skills in drug therapy assessment and drug information evaluation that can improve health care outcomes and lower costs. They also provide personalized care that addresses patient-related factors such as health literacy, health beliefs, and self-management skills that influence health outcomes and health care resource use. Interventions that focus on medication use are needed given concerns about the prevalence of TRPs, patient misunderstanding of drug regimens, and medication non-adherence rates (Lewis *et al.,* 2008).

In 2008, Lewis *et al.* conducted a pilot study in Michigan within community pharmacies, they used the comprehensive medication assessments to measure patients knowledge regarding medications, diagnoses, and healthy lifestyle practices and found that implementing comprehensive medication assessments by the pharmacists is beneficial in improving patient understanding of medications, diagnoses, and healthy lifestyle choices.

A study about the value of the pharmacists in community pharmacies concluded that in general community retail, pharmacists provide targeted patient education, systematic patient monitoring, patient feedback and behaviour modification. The study found that the adherence to medication regimens was improved, resulting in increased drug costs but overall reduction in medical costs; savings for total monthly medical costs ranged from $143.96 to $293.39 per patient per month (Munroe *et al*., 1997).

In 2006, Brown *et al*. emphasized that the pharmacist is the common link between the physician and the patient. As such, the pharmacist's role is to serve as the final, common pathway of medication delivery and the conduit of most medication information to the patient. As the dispenser of prescribed medication, the pharmacist is in a unique position of detecting both patient-reported problems and problems made by the healthcare provider. The pharmacist is the final checkpoint in preventing a problem from reaching the patient. To examine this theory, data about the pharmacist's role, responsibilities, and expectations to inform physicians were collected from 30 pharmacist and 31 patient focus groups. The study was conducted between July 2002 and July 2003 in pharmacies. The study concluded that the pharmacist is a frequent interceptor/detector of TRPs but fails to report these data to the appropriate healthcare provider.

In the beginning of 2000, Beney *et al*. examined the effect of expanding outpatient pharmacists' roles on health services utilization, costs, and patient outcomes. To do so; 25 studies were included in a systematic review involving more than 40 pharmacists and 16,000 patients. Data from those studies were used in 4 comparisons between regular care

and pharmacist care:

- For comparison 1: Pharmacist services targeted at patients versus services delivered by other health professionals. The results showed that scheduled service utilization was slightly increased, whereas hospital admissions and emergency room admissions were decreased in pharmacist services group.
- For comparison 2: Pharmacist services targeted at patients versus the delivery of no comparable service. Pharmacist services decreased the use of non-scheduled health services, the number of specialty physician visits or the number and costs of drugs, compared to control patients. Improvements in the targeted patient condition were reported in studies that measured patient outcomes but patients' quality of life did not seem to change.
- For comparison 3: Pharmacist services targeted at health professionals versus services delivered by other health professionals. The intervention delivered by the pharmacist was less successful than that delivered by physician counsellors in decreasing inappropriate prescribing.
- For comparison 4: Pharmacist services targeted at health professionals versus the delivery of no comparable service. All studies demonstrated that pharmacist interventions produced the intended effects on physicians prescribing practices. The one study measuring patient outcomes was unable to show a difference in patients' quality of life.

The review concluded that only two studies compared pharmacist services with other health

professional services. Both had some bias and did not allow the authers to draw conclusions about comparisons 1 and 3. The other studies supported the expanded roles of pharmacists in patient counselling and physician education. However, doubts about the generalizability of the studies, the poorly defined interventions, and the lack of cost assessments and patient outcome data, indicate that more rigorous research is needed to document the effects of outpatient pharmacist interventions (Beney *et al.*, 2000).

According to Garwood *et al.* (2008); transition of patients from a pharmacist-managed anticoagulation clinic back to physician-managed anticoagulation care after stabilization of warfarin therapy was associated with a significant decrease in INR control, increased medical care related to anticoagulation, and decreased patient satisfaction.

Schneider *et al.* (1982) studied the role effectiveness of a pharmacist in the maintenance of patients with hypertension and congestive heart failure; the study suggested that the pharmacist has an effective role in the management of patients with those conditions.

With regard to elderly patients, 90 community pharmacies were included in a cohort study to evaluate the extent and quality of prescription counselling available in community pharmacies. It has been estimated that potentially inappropriate medications are prescribed for nearly one-fourth of this cohort, and that at least one potentially inappropriate medication is prescribed in 4.5% of outpatient visits by the elderly.

The study concluded that pharmacies generally provided adequate prescription counselling services. This was true whether the pharmacies were community independent, large chain,

or on-line pharmacies (Schatz *et al.,* 2003).

Pharmacists in an Indiana community pharmacy developed an asthma management program for local patients, the program was applied for a year and patients follow up suggested that they experienced significant improvements in quality of life, hospitalizations decreased by 77%, ER visits decreased by 78% and urgent care visits decreased by 25%. This approves the important role of community pharmacists in improving quality of life and reducing costs (Rupp *et al.,* 1997).

3. AIMS AND OBJECTIVE

Specific objectives were:

- To examine the prevalence and nature of TRPs in patients with chronic diseases who attend community pharmacy.

- To evaluate the role of clinical pharmacist in detecting and resolving TRPs for patients with chronic diseases attending community pharmacy settings.

- To investigate physicians' acceptance of recommendations made by clinical pharmacist and to evaluate their responses.

- To evaluate the role of clinical pharmacist on disease control and patient's quality of life in community pharmacy settings.

4. METHODS

4.1 Study design

The study was designed as a prospective randomized controlled trial. Ethical approval was obtained from a local ethical committee.

Clinical setting

Two pharmacies were participated in the study. Data collection was conducted daily (except week ends) from 10 AM to 5 PM. Data collection lasted for two months in each pharmacy.

Study subjects

Inclusion criteria were:

1) Age more than 18 years old

2) At least one chronic medical condition

3) Receiving at least three medications.

Patients with mental illness were excluded from the study.

Patients with serious TRPs and who were in the control group were also excluded for ethical reasons. All patients who agreed to participate have read and signed a patient consent form (Appendix 1).

Patients from non-cooperative physicians were excluded from the study.

Eligible patients were randomized into two groups, intervention and control groups. Randomization was done according to computer generated randomization table (Appendix 2). (www.randomization.com).

Sample size

We used the data from the first 20 patients to estimate the minimum required sample size. The mean difference in TRPs that were resolved or prevented between the intervention and control group was 2 (Standard deviations were 1.9 and 0.3). Setting alpha at 0.05 and using power of 90%, we estimated that the minimum required sample size to obtain a significant difference is 60 subjects per group. Assuming that 20% of subjects may be lost to follow up, then the total required sample size was determined to be 150 patients. Hence, we decided to include 160 patients.

Procedure

• Intervention group received complete pharmaceutical care services. This included

1. Collecting patient database: The Pharmaceutical Care Manual was used to build patient database (Aburuz *et al*., 2011b). Database (Appendix 3) was collected from patients' interview and patients' medical files. Medical files were obtained from patients' physician (patient’s agreement was already taken).

Patient interviewing: All patients were interviewed to obtain demographic and medical informations. Patients were also interviewed about adherence to medications (Appendix 4), knowledge about medications (Appendix 5), adherence to non-pharmacological therapy (Appendix 6) and knowledge about non-pharmacological therapy (Appendix 6).

2. Patient database was analysed to identify treatment related problems.

3. A pharmacy care plan (Appendix 7) was designed for each patient to address all of the patients TRPs.

4. Based on the identified TRPs and developed pharmacy care plan, consult notes (Appendix 8) were written to document TRPs. Patient level TRP were resolved directly with patients. Other TRPs were directly submitted and discussed with physicians using consult note format.

5. All patients were followed up to ensure implementation of recommendations and achievement of desired outcomes. Follow up occurred in the pharmacy settings during the patients' visits, phone calls were done to set a follow up appointments for the patients.

• Control group received only the first three steps of pharmaceutical care without submission of consult notes. TRPs were identified and documented without any intervention. All control group patients were also followed up to document the outcomes of TRPs.

• All pharmaceutical care activities were documented using the Pharmaceutical
Care Manual (AbuRuz *et al.,* 2011b).

Identification of treatment related problems

A systematic approach was utilized in identifying TRPs. Efficacy related problems were identified through comparing patients' treatment with the most updated clinical practice evidence based guidelines recommendations. Appropriateness of dosing regimen was checked by comparing doses with evidence based guidelines recommendations or using drug information references such as Lexi- comp's Drug Information Handbook. Patients' clinical characteristics were taken into account when deciding about the appropriateness of dosage regimen. Actual adverse drug reactions were identified by conducting review of

symptoms and by investigating patients' clinical data. Potential adverse drug reactions were also checked by identifying patients who were at risk but weren't receiving prophylaxis (e.g. patients not receiving prophylaxis for NSAIDs induced ulcer). I-Facts (Facts and Comparisons Drug Interactions Facts) was used for identifying clinically important drug-drug interactions.

Classification of treatment related problems

Classification of treatment related problems by AbuRuz *et al.* (2006) was used (Appendix 9). Several classification systems for treatment related problems were identified previously. AbuRuz *et al.* (2006) carefully examined these classification systems and they determined that treatment related problems could be pooled under seven main categories:

1. Unnecessary drug therapy 2. Untreated condition 3.Effectiveness 4.Safety 5.Knowledge 6.Adherence 7.Miscellaneous

* The Unnecessary drug therapy category: the patient is receiving a medication for no valid medical indication. This includes five subcategories:

1. Drug use without indication.

2. Addiction or recreational drug use.

3. The patient treatment should be stepped down.

4. Duplication.

5. Treating avoidable adverse drug reaction.

* The Untreated condition category: the patient has a medical problem that requires medication therapy but is not receiving it.

*The Effectiveness category include four subcategories:

1. More effective drug is available/recommended: The patient has a medication indication but he is not being treated properly to achieve the treatment goals so he needs therapy modification by replacing the current medication according to guidelines recommendations.

2. Additional/Combination therapy required: The patient has a medication indication but he is not being treated properly or he did not achieve the treatment goals and needs therapy modifications by adding drug according to guidelines recommendations.

3. Efficacy dose regimen issue: The patient has a medical problem that is being treated with too little of the correct medication because of a wrong dose, frequency or duration.

4. Efficacy interaction issue: The patient has or is at risk of being under-treated as a result of a drug–drug, drug–food or drug–laboratory test interaction.

*The Safety category includes 6 subcategories:

1. The current drug is contraindicated/unsafe: The patient treatment should be stopped or monitored closely according to the patients condition.

2. A safer drug is recommended: The patients therapy is not safe and should be stopped and replaced with a safer option.

3. High risk of adverse drug reaction: The patient has or is at risk of developing a medical problem or symptom that is the result of this drug therapy.

4. Allergic drug reaction: the patient has a medical problem that is a result of drug allergy. The drug should be stopped and the allergy should be treated.

5. Safety dose regimen issue: the patient is being treated with too much of the correct medication because of a wrong dose, frequency or duration.

6. Safety interaction issue: The patient has or is at risk of developing adverse drug reaction as a result of a drug–drug, drug– food, or drug– laboratory test interaction.

*The Inappropriate knowledge category: includes two subcategories:

1. Inappropriate medication knowledge: The patient was not instructed or does not understand important issues regarding his medications recommendations.

2. Inappropriate non-pharmacological therapy knowledge: The patient was not instructed or does not understand important issues regarding his diseases, life style and non-pharmacological therapy recommendations.

*The Inappropriate adherence category: includes three subcategories:

1. Inappropriate medication adherence: The patient does not adhere to the recommendations made by health care professionals regarding his medications.

2. Drug product is not available: The patient does not adhere to the recommendations made by health care professionals regarding his medications due to unavailable drug.

3. Inappropriate non-pharmacological therapy adherence: The patient does not adhere to the recommendations made by health care professionals regarding his life style or non-pharmacological therapy.

* The Miscellaneous category includes eight subcategories:

1. A need for additional or more frequent monitoring.

2. A need for additional diagnostic test.

3. A need for consultation.

4. The chosen medication is not cost effective.

5. Other dose regimen issue: The patient may also have inappropriate dose regimen because of inappropriate timing or wrong dosage form.

6. Other interaction issue.

7. Administrating errors.

8. Dispensing errors.

Definition of the clinical significance of identified treatment related problems:

TRPs severity was classified into the following categories (Dodd, 2003):

Minor: one which if omitted would probably have no effect on patient's outcome.

Moderate: one that if current practice continued could have an undesirable effect on patient's outcome.

Major: one that if current practice continued could be detrimental for patient's outcome.

Outcomes of treatment related problems

Outcomes of TRPs were classified into five categories:

-Resolved: Therapeutic outcome was achieved.

-Improved: Therapeutic outcome was improved.

-Prevented: Future morbidity was prevented as a result of resolving treatment related problems. Preventing adverse drug reaction, drug-drug interaction, education for inappropriate knowledge and adherence were considered as "prevented".

-No change: the therapeutic outcome was not improved or changed.

-Worsened: the therapeutic outcome was worsened

4.2 Outcome measures

- The intervention and control groups were compared in terms of the following:

1. Degree of physicians' acceptance of clinical pharmacists recommendations (for the intervention group).
2. Number of TRPs that were corrected (action was taken to resolve them in the intervention group).
3. Therapeutic outcomes: These were measured in term of the number of TRPs resolved, improved, not changed, worsened and prevented.
4. Improvements in the patient's quality of life.

- Secondary outcome measures were:

1. Prevalence and nature of TRPs
2. Significance of identified TRPs
3. Patient satisfaction.

4.3 Instruments

Pharmaceutical Care Manual (AbuRuz *et al.,* 2011b) was used for data collection and evaluation which consists of the following parts:

- Patient database (Appendix 3).

This part was designed to collect and record demographic and administrative information, history of the present illness, acute and chronic medical problem, past medical history, review of system, family history, life style, social history, allergies, vital signs, physical examination data, lab data, drug serum concentration, diagnostic test results, medications prior to visit and current medications.

- Treatment Related Problems Classification System (Appendix 9).

- Pharmacist care plan /monitoring sheets (Appendix 7).

Each medical problem, TRP, and recommendation, was documented with its desired outcome, and monitoring parameters. TRPs were followed up and outcomes were documented.

- Consult Note Sheet (Appendix 8).

Each of the TRPs identified in the intervention group was recorded in a SOAP (subjective, objective, assessment and plan) format

Consult note and submitted for the physician for approval by taking an appointment with the physicians who agreed to participate in the study, consults notes were discussed and physicians agreement were taken.

- Assessment sheets (Appendix 10).

The assessment sheets are important to help in analysing the patient data for the presence of TRPs.

- The following were included in the assessment part of the Pharmaceutical Care Manual

Indication/treatment Assessment Sheet

Dosage Regimens Assessment Sheet

Drug Interactions Assessment Sheet

Adverse Drug Reaction Assessment Sheet

Self-reported medication adherence questionnaire:

Adherence with medications was assessed using patient interview method. The questionnaire (Appendix 4) was developed and validated by AbuRuz (2011) based on a

scale developed by Morisky *et al*. (1986). The questionnaire is composed of five items asking the patients how often during the last month they forgot to take their medication, skipped their medication, stopped their medication when they felt better, stopped their medication when they felt worse or stopped their medication when they experienced side effect. The questionnaire was scored at scale of 0 (never), 1 (rarely), 2 (sometimes), 3 (often) and 4 (always).

The patients were considered under-adherent if they scored 1.0 or more in the total adherence score.

Knowledge about medication questionnaire

Patients knowledge about medication was assessed by asking the patient about four items related to their medication (Appendix 5), these items includes:

1) Knowledge about medications names (either generic or brand).

2) The dose, route and frequency of medications.

3) The indication for medications.

4) Timing of taking medications (before/after meal, at bedtime, etc).

Patients were asked to mention what do they know about their medications. Then patients' knowledge was recoded into Yes (patient knows) and No (patient doesn't know) for each of the previous four aspects. The questionnaire was scored at scale of 0 (No), and 1 (Yes). This means that the higher the score out of 4.0 the better the patient's knowledge about drug therapy. The patients were considered to have a problem in their knowledge regarding drug therapy if they scored 3.0 or less in the total knowledge score. The questionnaire was obtained from the Pharmaceutical Care Manual (AbuRuz *et al.,* 2011b).

Knowledge about non-pharmacological therapy questionnaire

Knowledge about non-pharmacological therapy was assessed using open-ended questions to ask the patients what they know about the life style adjustments that must be done to improve their disease status (Appendix 6).

The patient's answers were treated as yes if they know the correct thing to be done and no if they do not know. The answers were scored at scale of 0 (No) and 1 (Yes).

Self reported adherence to self-care activities questionnaire

Adherence to self-care activities was assessed using patient interview method (Appendix 6). After assessment of patient's knowledge about non-pharmacological therapy, they were asked if they are adherent to it. If they didn't know the non-pharmacological therapy then this part was not applicable. If they knew, they were asked if they are adherent or not. Their answers were scored at scale of 0 (never), 1 (rarely), 2 (sometimes), 3 (often) and 4 (always).

Short Form-12 Health Survey (SF 12):

The SF-12 contains 12 items from the Short Form-36 Health Survey (SF-36). It was originally developed in 1994 as a shorter alternative to the SF-36. The SF-12 contains one or two items that measure each of the eight concepts included in the SF-36: physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems, and mental health. These eight domains were further aggregated into two summary measures: the physical component summary measure and the mental component summary measure. The physical component summary measure includes physical functioning, role-physical, bodily pain, and

general health scales while the mental component summary measure includes vitality, social functioning, role-emotional and mental health scales. Like the SF-36, the SF-12 is available in standard (4-week recall) and acute (1-week recall) formats. In our research we used the standard format.

The concordance between the SF-12 and the SF-36 on both physical and mental summary scores is high and the relationship is linear and positive. The greater part of the variance in the SF-36 can be explained by the variance in the corresponding SF-12 scores. Therefore, physical component summary-12 is a good predictor for the physical component summary-36 as is the mental component summary-12 for the mental component summary-36. Given that the SF-12 is an alternative to the SF-36.

The Arabic version of the SF12 was validated among Jordanian population by AbuRuz, (2011) (Appendix 11).

Patient satisfaction questionnaire:

This questionnaire was used to measure the patients' satisfaction with pharmaceutical care service. It is composed of 11 questions that measure different aspects of pharmaceutical care services (Appendix 12).

Blood pressure, Blood Glucose, Triglyceride and Total Cholesterol:

Blood pressure, Blood Glucose, Triglycerides and Total cholesterol were measured using commercially available instruments to assess the of disease control.

For blood pressure measurement Mercurial Sphygmomanometer was used (ESMES Model TM-101 Desk Type).

Accutrend GCT (Roche) was used to measure glucose, triglyceride and total cholesterol

levels.

4.4 Data Analysis

Data were coded and entered into SPSS program version 17.

Categorical data were expressed as numbers (%) and continuous data were expressed as means (standard deviation). Group differences (intervention, control) were examined using independent sample t-test for continuous independent variables. Chi-squared analysis was used to analyse categorical independent variables. To be considered statistically significant *P* value should be less than 0.05.

5. RESULTS

5.1 Study sample

A convenient sample of 21 community pharmacies was contacted regarding the study, however, only 2 agreed to participate.

This study conducted between September 2009 and June 2010.

The first pharmacy was located in Amman and was serving an average of 60 patients per day. 11.7% of the patients were eligible for the study (an average of 7 patients daily), around 19% of the eligible patients were recruited in the study (an average of 1.35 patients daily). A total of 57 patients were recruited from the first pharmacy.

The second pharmacy was located in Salt, around 70 patients were visiting this pharmacy daily, 8.6% of the patients were eligible for the study (an average of 6 patients daily), from those around 40.8% of the eligible patients were recruited in the study (an average of 2.45 patients daily). A total of 103 patients were recruited from the second pharmacy.

47 physicians were contacted during the study period, 27 refused to participate with the clinical pharmacist; the cases related to those physicians were not included in the study (150 cases). 50 patients refused to participate in the study, this maybe due to privacy reasons. 5 patients were excluded from the study's control group because of serious TRPs. None of the patiens were lost to follow up.

Specialities of physicians who agreed to participate in the study were: 3 respiratory, 4 internal medicine, 2 general practitioners, 2 cardiologists, 2 oncologists, 2 endocrinologists,

1 family doctor, 1 neurologist, 1 rheumatologist, 1 nephrologist and 1 gastrointestinal specialist.

During the study period 160 patients were recruited and randomized into intervention and control groups. All patients were followed up for an average of 3.39 month.

5.2 Demographic characteristics

Demographic characteristics of the study sample are shown in Table 1. Mean ages for the intervention and control groups were 53.6 and 52.4, respectively with no statistical difference between groups.

Table 1 Demographic characteristics of the study sample

Parameter	Total population	Intervention group	Control group	*P* value
Total no of patients (%)	160	82 (51.3%)	78 (48.8%)	
Age (year) mean (SD)	53.01 (15.39)	53.57 (16.03)	52.41 (14.77)	0.634
Gender, male N (%)	76 (47.5)	39 (47.4)	37 (47.6)	0.987
Education, N (%)				
None	23 (14.4)	12 (14.6)	11 (14.1)	
Preliminary	21 (13.1)	11 (13.4)	10 (12.8)	0.807
Secondary	4 (2.5)	3 (3.7)	1 (1.3)	
Tawjihi	33 (20.6)	18 (22)	15 (19.2)	
Diploma	33 (20.6)	18 (22)	15 (19.2)	
University degree	46 (28.8)	20 (24.4)	26 (33.3)	
Body mass category, N %				
Under weight	2 (1.3)	0 (0)	2 (2.6)	
Normal	41 (25.6)	19 (23.2)	22 (28.2)	
Over weight	70 (43.8)	36 (43.9)	34 (43.6)	0.124
Obese	29 (18.1)	20 (24.4)	9 (11.5)	
Morbid obesity	18 (11.3)	7 (8.5)	11 (14.1)	
BMI Mean, (SD)	27.97 (5.40)	28.17 (4.72)	27.75 (6.06)	0.623

5.3 Clinical characteristics

Medical and disease related characteristics of study sample are shown in Table 2. No statistical differences between the two groups were found. The mean number of the medical problems among study patients was 3.56 problems.

As shown in Table 2, the most common medical problems were hypertension, Diabetes, CVD risk, hyperlipidemia, and obesity/morbid obesity.

The most frequent drug classes purchased by the patients were diuretics, biguanides, beta-blockers, aspirin and sulfonylureas.

There were differences in the frequency of medical conditions and medications between the intervention and control groups, these are not expected to affect the main outcomes of the study.

Table 2 Clinical characteristics of the study sample

Parameter *	All population (160)	Intervention group (82)	Control group (78)	*P* value
Number of acute and chronic medical problems	3.56 (1.15)	3.7 (1.13)	3.42 (1.57)	0.134
Number of medications	4.73 (1.79)	4.51 (1.84)	4.96 (1.72)	0.135
Most frequent medical conditions, N(%)				
Hypertension	99 (61.9)	41 (50)	58 (74.4)	
Diabetes	80 (50)	45 (54.9)	35 (44.9)	
Hyperlipidemia	61 (38.1)	34 (41.5)	27 (34.6)	
CVD risk	49 (30.6)	23 (28.1)	26 (33.3)	
Obesity /morbid obesity	48 (30)	28 (34.2)	20 (25.6)	
Most frequent drug classes, N(%)				
Diuretics	95 (59.4)	32 (39)	53 (68)	
Biguanides	67 (41.9)	39 (47.6)	28 (35.9)	
Beta Blockers	54 (33.8)	17 (20.7)	37 (47.4)	
Aspirin	50 (31.3)	16 (19.5)	34 (43.6)	
Sulfonylureas	47 (29.4)	26 (31.7)	21 (26.9)	

* Parameter described as mean (standard deviation) unless stated otherwise

5.4 Treatment related problems

General description of TRPs identified on the initiation of the study is shown in Table 3.

A total of 859 TRPs were identified during the study period. The most common identified TRPs categories were Efficacy issues, Inappropriate Adherence and Miscellaneous problems. The mean number of TRPs was 5.37 TRPs for each patient. There was no statistical difference in the number of identified TRPs between the intervention and control groups.

Table 3 Treatment related problems

Parameter	Total population (160) N%	Intervention group (82) N%	Control group (78) N%	*P* value
TRP total	859	455 (53.0)	404 (47.0)	
Unnecessary drug therapy	75 (8.73)	29 (6.37)	46 (11.39)	
Untreated condition	84 (9.78)	41 (9.01)	43 (10.64)	
Efficacy	200 (23.28)	121 (26.59)	79 (19.55)	
Safety	37 (4.31)	24 (5.28)	13 (3.22)	
Inappropriate Knowledge	120 (13.97)	68 (14.95)	52 (12.87)	
Inappropriate Adherence	179 (20.84)	80 (17.58)	99 (24.51)	
Miscellaneous	164 (19.09)	92 (20.22)	72 (17.82)	
TRP mean (SD)	5.37 (3.01)	5.55 (2.635)	5.17 (3.36)	0.424

5.5 Description of treatment related problems

Table 4 provides a closer look at TRPs. The most common specific treatment related problems were similar in both groups. Around 16 % of problems were related to medication adherence. Around 13% of the problems were related to the need for additional/combination therapy. Poor knowledge about non-pharmacological therapy and lifestyle changes accounted for around 12% of the problems. The need for additional monitoring was also common (12%). The above mentioned most frequent problems were the same for intervention and control groups.

Table 4 Description of treatment related problems

Parameters	All population (160) N (%)	Intervention group (82) N (%)	Control group (78) N (%)
1. Unnecessary drug therapy	75 (8.73)	29 (6.37)	46 (11.39)
1.a Drug use without an indication	50 (5.82)	19 (4.18)	31 (7.67)
1.b Addiction or recreational drug use	2 (0.2)	2 (0.44)	0 (0)
1.c The patient treatment should be stepped down	1 (0.1)	0 (0)	1 (0.25)
1.d Duplication	20 (2.33)	7 (1.54)	13 (3.22)
1.e Treating avoidable adverse reaction	2 (0.2)	1 (0.22)	1 (0.25)
2. Untreated conditions	84 (9.78)	41 (9.01)	43 (10.64)

2.a Untreated conditions that require drug therapy	84 (9.78)	41 (9.01)	43 (10.64)
3. Efficacy	200 (23.28)	121 (26.59)	79 (19.55)
3.a More effective drug is available / recommended	10 (1.16)	3 (0.66)	7 (1.73)
3.b The patient requires additional / combination therapy	111 (12.92)	66 (14.51)	45 (11.14)
3.c Efficacy dosage regimen issue	78 (9.08)	51 (11.21)	27 (6.68)
3.d Efficacy interaction issue	1 (0.1)	1 (0.22)	0 (0)
4. Safety	37 (4.31)	24 (5.28)	13 (3.22)
4.a A current drug is contraindicated/unsafe	0 (0)	0 (0)	0 (0)
4.b Safer drug is recommended	0 (0)	0 (0)	0 (0)
4.c High risk for ADR	1 (0.1)	0 (0)	1 (0.25)
4.d Allergic reaction or undesirable effect	0 (0)	0 (0)	0 (0)
4.e Safety dosage regimen issue	31 (3.61)	19 (4.18)	12 (2.97)
4.f Safety interaction issue	5 (0.58)	5 (1.1)	0 (0)

5. Inappropriate knowledge	120 (13.97)	68 (14.95)	52 (12.87)
5.a The patient is not instructed or does not understand important information regarding his medication	19 (2.21)	12 (2.64)	7 (1.73)
5.b The patient is not instructed or does not understand important information regarding non-pharmacological therapy	101 (11.76)	56 (12.31)	45 (11.12)
6. Inappropriate adherence	179 (20.84)	80 (17.58)	99 (24.51)
6.a Problem in adherence to medication	141 (16.41)	63 (13.85)	78 (19.31)
6.b Drug is not available	1 (0.1)	0 (0)	1 (0.25)
6.c Problem in adherence to self care activities or non-pharmacological therapy	37 (4.31)	17 (3.74)	20 (4.95)
7. Miscellaneous	164 (19.09)	92 (20.22)	72 (17.82)
7.a A need for additional or more frequent monitoring	108 (12.57)	54 (11.87)	54 (13.37)
7.b A need for additional diagnostic test	25 (2.91)	14 (3.08)	11 (2.72)

7.c A need for consultation	13 (1.51)	12 (2.64)	1 (0.25)
7.d The chosen drug is not cost effective	0 (0)	0 (0)	0 (0)
7.e Other dosage regimen issues	17 (1.98)	12 (2.64)	5 (1.24)
7.f Other interaction issue	0 (0)	0 (0)	0 (0)
7.g Administering errors	0 (0)	0 (0)	0 (0)
7.h Dispensing errors	1 (0.1)	0 (0)	1 (0.25)

5.6 Clinical significance of the identified treatment related problems

90.3% of the identified TRPs were classified as major problems and 9.2% were moderate (Table 5).

All the TRPs related to adherence and knowledge were considered to be major. Most of monitoring requirement were considered being major especially when the last test was done over 3 years and the patient's condition seems to be uncontrolled.

Table 6 shows examples and significance of some of the identified TRPs.

Table 5 Frequencies and percentages of treatment related problems according to clinical significance

Clinical Significance N %	Treatment related problem
Major 60 (80) Moderate 12 (16) Minor 3 (4)	Unnecessary drug therapy
Major 77 (91.7) Moderate 7 (8.3) Minor 0 (0)	Untreated condition
Major 175 (87.5) Moderate 25 (12.5) Minor 0 (0)	Efficacy
Major 21 (56.7) Moderate 16 (43.3) Minor 0 (0)	Safety
Major 118 (98.3) Moderate 2 (1.7) Minor 0 (0)	Inappropriate knowledge
Major 179 (100) Moderate 0 (0) Minor 0 (0)	Inappropriate adherence
Major 146 (89) Moderate 17 (10.4) Minor 1 (0.6)	Miscellaneous
Major 776 (90.3) Moderate 79 (9.2) Minor 4 (0.5)	All treatment related problems

Table 6 Examples of the identified treatment related problems

Treatment related problem category	**Identified treatment related problem**	**Clinical significance**
1. Unnecessary drug therapy		
1.a drug without medical indication	Omeprazole is used without medical indication in patient with no risk of NSAID induced ulcer, no frequent heart burn and no medical insurance	Major
1.b duplication of therapy	Two beta blockers used (maximal dose each)	Major
	Two brands of HCl thiazide (low dose each)	Moderate
2. Untreated condition		
2.a untreated Condition	Diabetic patient with no treatment	Major
	Patient with hypokalemia left without treatment	Major
3. Ineffective/ incomplete drug therapy		
3.b The patient needs combination therapy	Diabetic patient was on maximum metformin dose, his blood glucose was high and there was a need to add another hypoglycemic agent	Major
	Patient with moderate lower back pain, uses paracetamol and still in pain, there is a need to add diclofenac sodium gel (local)	Moderate

3.c efficacy dose regimen issue	Patient with congestive heart failure receiving digoxin at doses lower than needed according to its blood level.	Major
4. Safety		
4.e safety dose regimen issue	Aspirin for cardiovascular protection was used at 325 mg while it is recommended to use100 mg to minimize side effect.	Moderate
7. Miscellaneous	Diabetic patient with uncontrolled blood glucose needs monitoring of HbA1c% Patient with history of gout is using allopurinol and uric acid level is not measured since two years	Major Moderate

5.7 Medical conditions most frequently associated with identified treatment related problems

As shown in Table 7, the most frequent medical conditions associated with TRPs were hypertension, hyperlipidemia, asthma, diabetes mellitus and obesity/morbid obesity.

Table 7 Most frequent medical conditions associated with identified treatment related problems

Medical condition N (number of TRPs related to medical conditions) (%) (From total TRPs)	Most frequent treatment related problem N (%) (Within disease)
Hypertension 162 (18.9)	Lack of adherence to life style changes 74 (45.7) Need for additional monitoring 20 (12.4) Need for additional therapy 16 (9.9) Lack of adherence to medication 16 (9.9) Lack of knowledge about lifestyle changes 5 (3.1)
Hyperlipidemia 79 (9.2)	Need for additional therapy 19 (24.1) Efficacy dosage regimen issue 13 (16.5) Untreated condition 11 (13.9) Safety dosage regimen issue 10 (12.7) Lack of knowledge about lifestyle changes 9 (11.4)
Asthma 92 (10.7)	Need for additional therapy 39 (42.4) Efficacy dosage regimen issue 19 (20.7) Need for additional monitoring 12 (13.1) Lack of knowledge about lifestyle changes 7 (7.6)
Diabetes mellitus 149 (17.3)	Need for additional monitoring 56 (37.6) Efficacy dosage regimen issue 21 (14.1) Need for additional therapy 19 (12.8) Safety dosage regimen issue 10 (6.7) Lack of adherence to life style changes 10 (6.7)
Obesity/morbid obesity 58 (6.8)	Lack of knowledge about life style changes 42 (72.4) Untreated condition 12 (20.7) Efficacy dosage regimen issue 4 (6.9)

5.8 Drug classes most frequently associated with identified treatment related problems

As shown in Table 8, the most common drug classes associated with the identified TRPs were diuretics, biguanide, sulfonylureas, beta 2 agonists and fibrates.

Table 8 Most frequent drug classes associated with the identified treatment related problems

Drug class, N (number of TRPs related to drug class) (%) from total TRPs	**Most frequent treatment related problems, N (%) within drug class**
Diuretics 60 (7)	Inappropriate adherence 38 (63.3) Need for combination therapy 10 (16.7) Duplication 5 (8.3) Safety dosage regimen issue 5 (8.3)
Biguanide 46 (5.4)	Efficacy dosage regimen issue 22 (47.8) Inappropriate adherence 12 (26) Need for combination therapy 8 (17.4) Drug use without indication 2 (4.4)
Sulfonylurea 41 (4.8)	Need for combination therapy 16 (39) Safety interaction issue 12 (26.8) More effective drug available 5 (12.2) Inappropriate adherence 4 (9.7)
Short acting Beta 2 agonist 50 (5.8)	Need for combination therapy 25 (50) Efficacy dosage regimen issue 14 (28) Inappropriate knowledge 11 (22)
Fibrates 28 (3.3)	Efficacy dosage regimen issue 13 (46.4) Need for combination therapy 8 (28.6) Inappropriate adherence 5 (17.9)

5.9 Types of required interventions for the identified treatment related problems

Table 9 shows the types of interventions required to resolve or prevent the identified treatment related problems in the study sample. Adherence counselling, need to add a drug, need for more frequent monitoring and the need for education were the most common types of interventions required to resolve and prevent treatment related problems.

Table 9 Required interventions for the identified treatment related problems

Intervention type	N (%)
Add drug	191 (22.2)
Adherence counselling	172 (20)
Monitor	140 (16.3)
Educate the patient	126 (14.7)
Stop drug	75 (8.7)
Increase frequency	44 (5.1)
Change drug	31 (3.6)
Change administration time	19 (2.2)
Decrease dose	16 (1.9)
Increase dose	16 (1.9)
Decrease frequency	16 (1.9)
Consultation	13 (1.5)

5.10 Physicians' acceptance of pharmaceutical care recommendations

The acceptance rate among the contacted physicians was very high, 94.1% (Table 10). Only 2% of TRPs in the control group were identified and corrected by physicians on their own.

Table 10 Physicians' acceptance for pharmaceutical care recommendations

Parameter	Total population (160) N (%)	Intervention group (82) N (%)	Control group (78) N (%)
Number of recommendation	859	455	404
Number of submitted recommendations	303	303* (66.6)	0
Number of accepted recommendations		285 (94.1)**	NA
Number of implemented recommendations		211 (74.1)***	NA
Number of TRPs corrected by physicians without pharmacists intervention***		NA	8 (2)****

* The rest of recommendations were at patient level

** Percentage within submitted

*** Percentage within accepted

**** This was added for comparison purposes

5.11 Outcome of treatment related problems

Tables 11 and 12 show comparison between the intervention and control groups in the outcome of treatment related problems. 80% of the identified TRPs were corrected in the intervention group compared to only 2% in the control group. This represents a 40 times benefit in intervention compared with control group which was reflected in achievement of the therapeutic outcomes and prevention of possible morbidity (76.4% Vs 2%).

Table 11 prevalence of outcomes of treatment related problems

Outcome	**Total population (160) N (%)**	**Intervention group (82) N (%)**	**Control group (78) N (%)**	***P* value**
Number of recommendations	859	455	404	
Number of TRPs corrected	370 (43.1)	363 (80)*	8 (2)	
Resolved**	198 (23)	***196 (43)	2 (0.5)	0.000
Improved	125 (15.6)	119 (26.2)***	6 (1.5)	0.000
No change	440 (51.2)	87 (19)	353 (87.4)	0.000
Worsened	55 (6.4)	18 (3.9)	37 (9.2)	0.267
Drug added to prevent future morbidity	26 (3)	26 (5.7)***	0 (0)	0.000
Not applicable	3 (0.3)	0 (0)	3 (0.7)	0.304
Prevented	7 (0.8)	7 (1.5)***	0 (0)	0.142
No data	5 (0.5)	2 (0.4)	3 (0.7)	0.228

* Corrected problems includes the implemented + on patient level for intervention group

** Resolved indicates that therapeutic outcome was achieved

*** Number of treatment related problems to prevent potential of future morbidity

Table 12 Statistical comparison for outcomes of treatment related problems per patient

Outcome	Total population (160) (mean, SD)	Intervention Group (82) (mean, SD)	Control Group (78) (mean, SD)	*P* value	Confidence interval of the difference
Resolved*	1.24 (2.03)	2.39 (2.303)	0.03 (0.159)	0.000	1.848 – 2.881
Improved	0.78 (1.242)	1.45 (1.398)	0.08 (0.387)	0.000	1.05 – 1.698
No change	2.75 (3.096)	1.06 (1.299)	4.53 (3.433)	0.000	-4.268 – -2.662
Worsened	0.34 (0.753)	0.22 (0.522)	0.47 (0.922)	0.032	-0.487 – -0.22
Drug added	0.16 (0.513)	0.32 (0.683)	0 (0)	0.000	0.164 – 0.47
Not applicable	0.02 (0.237)	0 (0)	0.04 (0.34)	0.307	-0.113 – 0.036
Prevented	0.04 (0.283)	0.09 (0.391)	0 (0)	0.056	-0.002 – 0.173
No data	0.03 (0.261)	0.02 (0.155)	0.04 (0.34)	0.735	-0.096 – 0.068

* Resolved indicates that therapeutic outcome was achieved

5.12 Disease control

Table 13 explains the role of clinical pharmacist in disease control, there were no significant differences between intervention and control groups at baseline in the glucose, blood pressure and triglyceride values; but at follow up there were significant differences between control and intervention groups

Table 13 Disease monitoring

Monitoring parameter	**Intervention baseline mean (SD)**	**Control baseline mean (SD)**	***P* value**	**Intervention follow up mean (SD)**	**Control follow up mean (SD)**	***P* value**
Blood pressure	119.17/84.05 (12.98)	121.36/84.58 (13.83)	0.576	110.36/81.55 (5.454)	125.0/88.73 (10.34)	0.000
Blood glucose	121.65 (27.26)	118.55 (28.4)	0.331	99.08 (9.66)	115.48 (17.34)	0.000
Trigyceride	197.85 (43.67)	188.19 (60.34)	0.471	148.53 (15.98)	170.74 (6.26)	0.001

5.13 Quality of life

We assessed the patients' quality of life at base line and follow up using SF 12. Table 14 summarizes the results.

Table 14 Quality of life

	Physical scale difference mean (SD)	**Mental scale difference mean (SD)**	**Confidence Interval**
Intervention group (82)	6.04 (13.74)	7.99 (12.26)	-1.89159 - 6.69981
Control group (78)	3.63 (13.77)	8.09 (14.73)	-4.32173 - 4.12213
P value	0.271	0.998	

5.14 Patient Satisfaction with pharmaceutical care service

Table 15 shows the results for patient satisfaction questionnaire.

Table 15 Patients satisfaction

Satisfaction assessment	Intervention group (82) N%
Patient data analysis	Neutral 10 (12.2) Satisfied 36 (43.9) Very Satisfied 36 (43.9)
Discussion of recommendations with a physician	Neutral 12 (14.6) Satisfied 32 (39) Very Satisfied 38 (46.4)
Teamwork between the clinical pharmacist and a physician to optimise treatment	Neutral 2 (2.5) Satisfied 23 (28) Very Satisfied 57 (69.5)
Patient follow up	Neutral 6 (7.3) Satisfied 28 (34.2) Very Satisfied 48 (58.5)
Non-pharmacological therapy education	Neutral 2 (2.5) Satisfied 23 (28) Very Satisfied 57 (69.5)
Education about drug monitoring	Neutral 2 (2.4) Satisfied 24 (29.3) Very Satisfied 56 (68.3)
Education about drug mechanism	Neutral 5 (6.1) Satisfied 28 (34.2) Very Satisfied 49 (59.7)

Education about drug use	Neutral 2 (2.5) Satisfied 23 (28) Very Satisfied 57 (69.5)
Education about adverse drug reactions	Neutral 5 (6.1) Satisfied 29 (35.4) Very Satisfied 48 (58.5)
Adherence assessment	Neutral 2 (2.5) Satisfied 23 (28) Very Satisfied 57 (69.5)
Adherence counselling	Neutral 2 (2.5) Satisfied 23 (28) Very Satisfied 57 (69.5)

6. DISCUSSION

Drug therapy for most diseases enhances health–related quality of life, however, inappropriate use of drugs may be harmful and could evoke new symptoms. Drug therapy is growing more complex thus making appropriate drug prescribing an increasingly challenging process.

Pharmaceutical care is a professional movement that was officially started in the eighties of the last century, nowadays; it has become a dominant form of practice for thousands of pharmacists all over the world. The most important functions of the clinical pharmacist when providing pharmaceutical care is to identify, resolve and prevent TRPs. Most of the studies on pharmaceutical care were conducted at the United State of America and Europe, and they showed a positive impact of clinical pharmacist interventions. Clinical trials on pharmaceutical care in Jordan are few. A study was conducted in 2011 by Aburuz *et al.* to investigate the impact of pharmaceutical care on TRPs in hospitalized internal medicine patients, showed a positive impact of providing pharmaceutical care services on disease control and improving patients quality of life (Aburuz *et al.,* 2011c).

In the present study, 160 patients were recruited. Patients were randomly assigned into the intervention and control groups, 82 patients were assigned in the intervention group, 78 patients in control group.

Both groups of patients (intervention, control) were found to have similar demographic variables. The most prevalent medical conditions were hypertension (17.4%), diabetes (14%), hyperlipidemia (10.7%), CVD risk (8.6) and obesity/morbid obesity (8.4).

The most commonly purchased medications in the pharmacies were diuretics (12.6%), biguanides (8.4%), beta-blockers (7.1%), aspirin (6.6%) and sulfonylureas (6.2%).

Our results were similar to those by Rao *et al.* (2007); in which the most common conditions were hypertension, diabetes mellitus and hyperlipidemia in Minnesota, and hypertension, osteoarthritis, diabetes mellitus, peptic ulcer and hyperlipidemia in Australia.

In another study done by Lewis *et al.,* 2008, also the most common conditions among their study sample were hypertension, diabetes mellitus, hyperlipidemia and coronary artery disease.

Similar to results of a study in elderly patients (Vinks *et al.,* 2005) found that the most frequently prescribed drugs were antithrombotics, diuretics, lipid agents, beta blockers and inhalers.

Treatment related problems

Generally, it is difficult to evaluate results on frequency of TRPs from various studies, as both the definition of TRPs and the population differ from study to study. Very few studies have used a broad design to encompass and classify all categories of TRPs.

An important observation in the present study was that only 4 patients (2.5%) did not have any TRP. A mean number of TRPs was 5.37 and an average number of medical conditions was around 3.56 for each patient (an average of 1.5 TRP per patient). Most of the identified TRPs were judged to be of major clinical significance.

In Jordan, Aburuz *et al*. (2011c) found that the mean number of TRPs identified by clinical pharmacists was around 8 with an average of 8 medical conditions for each hospitalized patient (an average of 1 TRP per medical condition). This is less than the number identified in our study. This difference could be due to the fact that the hospitalized patients are more seriously ill and therefore are under regular follow up and strict control and receiving more medications compared to the out-patients who visit doctors occasionally. Lewis *et al*. (2008) studied the community pharmacy settings and found that the mean number of TRPs identified by clinical pharmacists was around 9.8 with an average of 6 medical conditions for each hospitalized patient (an average of 1.65 TRP per medical condition), which was comparable to our study.

"In-appropriate adherence", "Additional/combination therapy required", "Need for additional monitoring" and “In-appropriate knowledge” were the most common TRPs in the current study. This was comparable to previous studies. In a study conducted by McDonnell and his colleagues (McDonnell *et al.*, 2002), they found that "In-appropriate dosing" was the most common TRP while "In-appropriate drugs" was the most common TRP in the Hanlon and his colleagues’ study (Hanlon *et al.,* 2001) and “Need for additional drug therapy” in another study (Gurwitz *et al.,* 2002). Gilbert *et al*. (2002) found that "Need

for laboratory tests" was the most frequent TRP. In Australia Roughead *et al.* (2004) found that "Additional monitoring", "Wrong drug", "additional drug is needed" and "Taking too little of the drug" were the main TRPs. In Minnesota, Rao *et al.,* 2007 found that "Additional drug is needed", "Taking too little of the drug" and "Non-compliance" were the most frequent TRPs.

Around 13% of all TRPs were related to "Additional/combination therapy required" which indicates that disease management by physicians was not always based on the disease management guidelines and that the monitoring and follow-up for the pharmacotherapy outcomes were improper. The later issue was also evident in the miscellaneous TRPs where "Need additional or more frequent monitoring" was frequent TRP (12.5%).

"In-appropriate knowledge about medications" and "In-appropriate knowledge about non-pharmacological therapy" were also frequent (around 14%). This reflects the current situation in the health care system in Jordan where no one is formally responsible for patient education. This finding is supporting the important role that the clinical pharmacist can do to educate patients in order to increase their adherence as well as to improve quality of life and disease control.

Around ten percent of the identified TRPs were "Untreated conditions". Some of these were serious conditions that were left without treatment. Diabetes mellitus is an example. Patients are usually interpreting their symptoms in a wrong way; most of them do not seek medical attention unless serious disabling problems happen to them. Doctors are usually not aware or less cautious about medical conditions that are not related to their specialty.

This emphasizes the role of a clinical pharmacist in community pharmacy settings who can screen, follow up and assess the patient treatment from every aspect. Those results were comparable with previous studies; a study conducted in 2001 in Dutch (VanMill *et al.,* 2001) found that the most frequent TRPs were “Duplication” “Need for education about medications”, “Interaction” and “Incorrect dosing”.

The most frequent diseases associated with the identified TRPs were: hypertension, diabetes mellitus, asthma, hyperlipidemia and obesity/morbid obesity. The most frequent drug classes associated with the identified TRPs were related to these conditions including diuretics, biguanides, sulfonylureas, fibrates and short acting beta 2 agonists. Roughead *et al.* (2004) found that diuretics, lipid agents, digoxin and inhalers were the drugs most frequently associated with TRPs. They have also found that cardiovascular diseases were the most frequent conditions.

The most common type of interventions for the identified TRPs were "Need for monitoring", "Need for education", "Start a new drug" and “Need for adherence counselling”.

The intervention "Need for education" is considered as a major issue. This supports the urgent need for a health care system in Jordan in which proper counselling and education for patients about pharmacological and non-pharmacological treatment is an integral part.

Our data were comparable to those by Lewis *et al.,* study (2008) who found that the most frequent interventions required were monitoring, add drug, life style changes, and actions to avoid adverse drug reactions.

Physicians' acceptance of pharmaceutical care recommendations

Around 67% of the pharmacist recommendations for the intervention group were submitted to the physicians. The rest of recommendations were not submitted for several reasons; for example, many of these recommendations were on the patient level. On the other hand, physicians were busy and offered a short time for meeting the pharmacist, which was an important limitation.

A very important finding was that 94% of the submitted recommendations were accepted by physicians that indicates the high quality of recommendations and also reflects that physicians started to accept the role of clinical pharmacists.

Unfortunately, only 74% of the accepted recommendations were actually implemented, possibly due to the fact that physicians could not contact some of the patients during the study period without letting the clinical pharmacist to contact them. On the other hand, some physicians only partially agreed with the recommendations and the latter were not implement. Other explanations could be that the recommendations were not recorded in the patient's file.

Outcomes of treatment related problems

More than 80% of the TRPs were corrected in the intervention group compared with only 2% in the control group (the latter were identified and corrected by physicians). This represents a relative benefit of 40 times compared with the control group. The impact of the pharmacist interventions in improving therapeutic outcomes and preventing future morbidity was also clear and significant; the therapeutic outcomes were improved (or prevention of future morbidity) in more than 75 % of the TRPs in the intervention group compared to that in the control group, which was only 2%. This represents a relative benefit of 35 times compared with the control group.

Quality of life

There were no significant differences in the change of mental and physical scales in the patients' quality of life. This is mainly due to the short period of follow up.

Patient satisfaction

An important finding of the study was that most of the patients were very satisfied or satisfied from clinical pharmacist services; none were unsatisfied.

Patients were mostly satisfied about adherence counseling, education about drugs and non-pharmacological therapy, and teamwork between clinical pharmacist and physician; the reason is that those fields were focused directly on the patients.

7. CONCLUSIONS AND IMPLICATION FOR PRACTICE

This study has several findings that are very important and must be taken into consideration in order to improve the quality of the health care service in Jordan.

We found that TRPs are very common in community pharmacy patients and the provision of pharmaceutical care can result in improved recognition of the full range of the TRPs. Most of TRPs identified by pharmacists were clinically significant and, thus, if not resolved, can results in significant morbidity.

“Patient monitoring”, “Drug choice”, “Education and Adherence assessment and counselling” should be given the highest priority in community pharmacy patients as they were associated with the most frequent TRPs. Patients with cardiovascular diseases are of the main concern as they had the highest number of TRPs.

Physicians started to accept the role of pharmacist as health care provider and pharmacotherapy specialist and, thus, physicians will no longer be the major barrier for implementing pharmaceutical care in Jordan.

A major conclusion from the current study is that clinical pharmacist are able to reduce TRPs, improve therapeutic outcomes, and improve patient’s condition in community pharmacy patients.

Based on this study, we show very strong evidence supporting the role of clinical pharmacist in the health care system in Jordan. It is no longer acceptable to leave the health care system especially community pharmacies in Jordan without clinical pharmacy service.

Study limitations

The findings of the study should be interpreted with the following limitations in mind:

- Due to the lack of actual clinical pharmacy service, we were not able to submit and implement all recommendations; therefore, in ideal situation, we could have achieved better outcomes than what we have obtained in this study.

- The study was conducted in only 2 pharmacies, 19 pharmacies refused to participate.

- Many physicians refused to participate in the study.

- Limited time and space was available for interview.

- There was lack of privacy in the pharmacy settings.

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Appendices

Appendix 1: Patient consent from

<u>موافقة المتطوع على اجراء الدراسة</u>

العنوان

برنامج الرعاية الصيدلانية الشامل للمرضى اللذين يتناولوا ادوية متعددة في صيدليات المجتمع

اسم المشارك:

العنوان:

العمر:

الباحث: أوديت تادرس

١. يطلب منك المشاركة في دراسة تهدف الى اثبات دور الصيدلاني في تحسين الرعاية المقدمة للمرضى

٢. المطلوب منك هو المشاركة في المعلومات عن الامراض التي تعاني منها و الادوية التي تتناولها و نمط الحياة الذي تتبعه

للسيطرة على الامراض التي تعاني منها

٣. سوف يتم الاشارة اليك في الدراسةعن طريق رمز معين و لن يتم ذكر اسمك كما و لن يتم المشاركة في المعلومات الخاصة بك

٤. مشاركتك في الدراسة هي بمثابة عمل تطوعي

<u>اقرار المشاركة</u>

اقر ان تفاصيل الدراسة قد شرحت لي و اني قد قمت بالموافقة على المشاركة في هذه الدراسة و عليه اوقع

الاسم:

التوقيع:

التاريخ:

Appendix 2: Randomization Table

A Randomization Plan

From

http://www.randomization.com

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Appendix 3: Patient Database

Patient name:	**General health:**
Date of birth:	Age:
Ht:	BMI:
Wt:	Visit date:
Address:	Occupation:
Phone #:	Education:
Gender:	Insurance:
Marital status:	Allergies:

Past medical history:	**Past Medications:**	**Surgeries:**

Family history:	**Life style:**	**ROS:**
Other Lab tests:	Results:	Target/normal:

Medical problem	Medications	Effectiveness	Safety	Lab tests	Normal ranges	Doctor

Appendix 4: Medication adherence questionnaire (AbuRuz, 2011)

استبيان استخدام الدواء

الناس عادة يواجهون عدة مشاكل أثناء تناولهم لأدويتهم الموصوفة لتعددها واختلاف أوقاتها وأشكالها. نود أن نسألك بعض الأسئلة عن طبيعة استخدامك لدوائك.

		إطلاقا	نادرا	أحيانا	عادة	دائما
1	هل تنسى تناول دوائك؟					
2	هل تتوقف عن تناول دوائك من وقت لآخر؟					
3	هل تتوقف عن تناول دوائك عندما تشعر بتحسن؟					
4	هل تتوقف عن تناول دوائك إذا ساءت حالتك بعد أخذ الدواء؟					
5	هل تتوقف عن تناول دوائك إذا حصلت لك مضاعفات تعتقد أنها ناتجة عن استخدام الدواء؟					

أحيانا: جرعة واحدة في الأسبوع
عادة: جرعتين في الاسبوع
دائما: أكثر من جرعتين في الاسبوع

Appendix 5: Knowledge about drug therapy questionnaire (AbuRuz *et al.*, 2011b)

الاسم التجاري	الاسم العلمي	كيف تأخذ الدواء؟ كم مرة وكم حبة في كل مرة ؟	متى تأخذ الدواء (قبل/بعد الأكل)	لماذا تأخذ الدواء؟	أي ملاحظات أخرى مهمة متعلقة بالدواء؟

Appendix 6: Non-pharmacological therapy assessment sheet

ما هي امراضك المزمنة	ما هي الامور التي يجب الالتزام بها لتحسين هذه الامراض (غير الالتزام بالدواء)•	هل تلتزم بالقيام بهذه الامور

Appendix 7: PCP and Monitoring sheet

#	Date	Treatment Related Issue	Pharmacotherapy Goals and monitoring	Recommendations (Pharmacological, Non-pharmacological, Others)	Physician Action Agreed and implemented, Agreed but not implemented, Not agreed, Patient Level	Follow up and monitoring	Outcome	Comments

* Note: after the initial PCP is written, any new medical or treatment related problems should be [illegible] in TRP list, PCP, and [illegible] consult note

* Use the lab data in patient data base to assess the achievement of outcomes

** Write down lab data and state if the desired outcome was achieved or not (resolved, improved, no change, worsened)

Appendix 8: Consult Note

Consult Notes

Patient Name:

Consultant:

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A: 1.
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P: 1.
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5.

Monitoring: 1.
2.
3.
4.
5.

Date:

Counseling: 1.
2.
3.
4.
5.

Follow up: 1.
2.
3.
4.
5.

Decision: 1.
2.
3.
4.
5.

Pharmacist Name: Odate Tadros **Phone #:** 0795716671

Appendix 9: AbuRuz *et al.* (2006) Treatment Related Problems Classification System

Type Of Problem	Assessment	Drugs Involved/Comments
1. Unnecessary drug therapy	a) Drug use without an indication b) Addiction or recreational drug use c) The patient treatment should be stepped down (at this stage the patient needs non pharmacological therapy alone or he doesn't need combination therapy because of improvement in condition or because of guideline recommendations) d) Duplication (two drugs from the same pharmacological class with no clinical evidence approving such combination) e) Treating avoidable adverse reaction	
2. Untreated condition	a) Untreated conditions that require pharmacological or non-pharmacological therapy	
3. Efficacy	a) More effective drug is available/ recommended b) The patient requires additional/ combination therapy or stepping up because of actual or potential therapy failure or because of guidelines recommendation c) Efficacy dosage regimen issues d) Efficacy interactions issues	

4. Safety	a) A current drug is contraindicated/unsafe for patient condition and should be stopped, monitored or replaced b) a safer drug is recommended c) The patient is at high risk for developing ADR and needs monitoring or prophylaxis d) Allergic reaction or an undesirable effects: Are there symptoms or medical problems that may be drug induced? e) Safety dosage regimen issues f) Safety interactions issues	
5. Inappropriate knowledge	a) The patient is not instructed or does not understand important information regarding his medications (the purpose of his or her medication(s), how much, how and when to take it, what to avoid, how to prevent side effect and how to monitor his treatment) b) The patient is not instructed or does not understand non-pharmacological therapy or self care advice (avoidance of risk factors, smoking, alcohol, diet, exercise, etc.)	
6. Inappropriate adherence	a) A problem in patients' adherence to medications (forget, skip, can not afford, Cannot swallow/administer drug etc) b) Drug product not available c) A problem in patients' adherence to self care activities or non pharmacological therapy	

7.Miscellaneous	a) A need for additional or more frequent monitoring b) A need for additional diagnostic test c) A need for consultation d) The chosen medication(s) is not (are not) cost effective e) Other dosage regimen issues f) Other interaction issues g) Patient was discharged too early (i.e. before achieving recommended target) h)Administering errors i) Dispensing errors	

Appendix 10: AbuRuz *et al.* (2006) Patient Data Assessment Tool

Indication/Treatment Assessment Sheet

Patient's Medical Problems*	Medications Prescribed**	Pharmacological Class	Treatment of Choice ***	References

*Write only the problems that are actually suffered by the patients
** Check with the doctor or patient if unsure about the indication
***Taking into consideration liver and kidney function, age, pregnancy, other diseases, drugs and individual patient characteristics

Dose Regimen Assessment Sheet

Drug Used	Medical Problem	Recommended Regimen* (strength, frequency, route, duration, trimming and relationship to meal)	Actual Regimen (strength, frequency, route, duration, trimming and relationship to meal)	Agreement

* Taking into consideration liver and kidney function, age, other diseases, drug interactions and individual patient characteristics

Adverse Drug Reaction (ADR) Assessment Sheet

Drug	Potential ADR (common or significant)	Is the patient at risk for ADR? If yes, comment?	Actual ADRs

Drug Interactions Assessment Sheet

Drug1	Potential Interaction					
	Drug2	Others	Severity	Onset	Effect	Management

Patient Knowledge of Drug Therapy Assessment Sheet*

Medications	Dose regimen	Indication	Special instructions	Mark

Patient Knowledge of Non-Pharmacological Therapy Assessment Sheet*

Disease	What should you avoid	Food	Exercise	Special instructions	Mark

*Complete the charts with the patient using patient's own words
* Identify the gaps in patient knowledge and then fill in the gaps

Medications Adherence Assessment Sheet

Peoples usually have several problem with adhering to doctors recommendations. This is usually due to number of prescribed medications, or to the busy life style:

	never	rarely	sometimes	usually	always
Do you forget taking your medications					
Do you skip your medications when you feel better					
Do you skip your medications when feel worse after taking your medications					
Do you run out of your medications					
In general, do you adhere to what your doctor or pharmacist tell you regarding your life style (food, exercise, smoking…)					
Could you please tell us what were the most common reasons for you not to take your medications					

Appendix 11: Short form 12 questionnaire (AbuRuz, 2011)

استبيان صحي
هذا استبيان للسؤال عن آرائك حول حالتك الصحية. والتي سوف تساعدك في القدرة على فهم و متابعة . ما تشعر به وما أنت قادر على القيام به من الأنشطة الاعتيادية. من فضلك, أجب على كل الأسئلة في هذا الاستبيان. في حالة عدم وضوح أي سؤال, أرجو اختيار أقرب إجابة لمفهومك للسؤال.

بصورة عامة, كيف ترى حالتك الصحية ؟

سيئة	لا بأس بها	جيدة	جيدة جدا	ممتازة
☐	☐	☐	☐	☐

2.	تتعلق البنود التالية بأنشطة يمكن أن تقوم بها خلال يومك العادي. في الوقت الحالي, إلى أي مدى تقيدك حالتك الصحية:

لا تقيدني اطلاقا	نعم تقيدني قليلا	نعم تقيدني كثيرا			
☐	☐	☐	من ممارسة الأنشطة متوسطة الجهد, كتحريك الطاولة أو التنظيف باستخدام المكنسة الكهربائية أو تنظيف حديقة المنزل والعناية بها ؟	A	
☐	☐	☐	من صعود الدرج لعدة أدوار	B	

3.	تتعلق البنود التالية (أ , ب) بالمشاكل التي من الممكن أنها واجهتك التي خلال تأديتك لعملك أو للأنشطة اليومية المعتادة نتيجة لحالتك الصحية الجسمية. خلال الأسابيع الأربعة الماضية , هل تسببت حالتك الصحية الجسمية في :

لا	نعم			
☐	☐	التقليل مما تود إنجازه من العمل أو أي أنشطة أخرى	A	
☐	☐	تقييدك في أداء نوع معين من الأعمال أو أي أنشطة أخرى	B	

4.	تتعلق البنود التالية (أ , ب) بالمشاكل التي يمكن أن تواجهك خلال تأديتك لعملك أو للأنشطة اليومية المعتادة كنتيجة لحالتك الصحية النفسية (مثلا الشعور بالاكتئاب أو القلق) . خلال الأسابيع الأربعة الماضية

هل تسببت حالتك الصحية النفسية في :

		لا	نعم
a	التقليل مما تود إنجازه من العمل أو أي أنشطة أخرى	☐	☐
b	عدم إنجاز العمل أو أي أنشطة أخرى بالحرص المعتا د	☐	☐

5. خلال الأسابيع الأربعة الماضية إلى أي مدى أدى الألم الجسمي إلى التعارض مع تأديتك لأعمالك المعتادة (سواء داخل المنزل أو خارجه) ؟

كان هناك تعارض كبير جدا	كان هناك تعارض كبير	كان هناك تعارض متوسط	كان هناك تعارض قليل جدا	لم يكن هناك أي تعارض
☐	☐	☐	☐	☐

6. الأسئلة التالية تتعلق بكيفية شعورك و طبيعة سير الأمور معك خلال الأسابيع الأربعة الماضية, الرجاء إعطاء إجابة واحدة لكل سؤال بحيث تكون هذه الإجابة هي الأقرب إلى الحالة التي كنت تشعر بها .

خلال الأسابيع الأربعة الماضية , كم من الوقت :

		لم أشعر به في أي وقت من الأوقات	في قليل من الأوقات	في بعض الأوقات	في كثير من الأوقا ت	في معظم الأوقات	في كل الأوقا ت
a	شعرت بالهدوء والطمأنينة ؟	☐	☐	☐	☐	☐	☐
b	كانت لديك طاقة كبيرة ؟	☐	☐	☐	☐	☐	☐
c	شعرت بأنك منهك (استنفذت قواك) ؟	☐	☐	☐	☐	☐	☐

7. خلال الأسابيع الأربعة الماضية , ما مقدار الوقت الذي تعارضت فيه صحتك الجسمية أو مشاكلك النفسية مع نشاطاتك الاجتماعية (مثل زيارة الأصدقاء و الأقارب وغير ذلك)؟

لم يكن هناك تعارض في أي وقت من الأوقات	كان التعارض في قليل من الأوقات	كان التعارض في بعض الأوقات	كان التعارض في معظم الأوقات	كان هناك تعارض في كل الأوقات
☐	☐	☐	☐	☐

Appendix 12: Patient Satisfaction Questionnaire

ما رضاك عن الخدمة الصيدلانية المقدمة من الصيدلاني السريري من النواحي التالية:

١. تحليل حالتك و مرضك و ادويتك و ذلك لتحسين علاجك و حالتك الصحية 1، 2، 3، 4، 5

٢. الاتصال مع طبيبك لمناقشة علاجك و تحسينه و تحسين حالتك الصحية 1، 2، 3، 4، 5

٣. المساهمة مع الطبيب في وصف افضل علاج لك 1، 2، 3، 4، 5

٤. متابعة حالتك المرضية للتأكد من فاعلية الادوية و سلامتها 1، 2، 3، 4، 5

٥. تثقيفك بالمعلومات اللازمة عن امراضك 1، 2، 3، 4، 5

٦. تثقيفك بالمعلومات اللازمة عن ادويتك و كيفية متابعتها و مراقبة تأثيرها 1، 2، 3، 4، 5

٧. تثقيفك عن كيفية عمل دوائك 1، 2، 3، 4، 5

٨. تثقيفك الطريقة الصحيحة لأخذ دوائك 1، 2، 3، 4، 5

٩. تثقيفك بالمضاعفات التي قد تنتج عن استخدامك لدوائك و كيفية معالجتها أو منعها 1، 2، 3، 4، 5

١٠. تقييم درجة التزامك بالدواء 1، 2، 3، 4، 5

١١. تشجيعك على الالتزام بالدواء 1، 2، 3، 4، 5

١. غير راضي مطلقا

٢. غير راضي

٣. محايد

٤. راضي

٥. راضي جدا

برنامج الرعاية الصيدلانية الشامل للمرضى اللذين يتناولوا ادوية متعددة في صيدليات المجتمع

اعداد
اوديت كامل ابراهيم تادرس

المشرف
الدكتور صلاح الدين ابو الرز

ملخص

تعتبر صيدليات المجتمع مصدر للادوية سهل الوصول له و غير مسيطر عليه. الصيادلة في هذه الصيدليات عبارة عن اخصائيو دواء يوفروا الاستشارة في العديد من الامور الصحية و يساعدوا المرضى في تعزيز استعمال الدواء و تقليل كلفته ٠

استعمال الدواء بطرق غير مناسبة هي من الشاكل المنتشرة و نادرة التقييم في صيدليات المجتمع، و للصيادلة دور مهم في تحديد هذه المشاكل، منعها و الابلاغ عنها ٠

تم اجراء القليل من الدراسات في الاردن لتقييم اثر الصيدلاني السريري على المرضى داخل و خارج المستشفيات، النتائج كانت تدعم دورهم في تقليل المشاكل، تحسين السيطرة على الامراض و بالتالي تحسين نوعية حياة المرضى ٠

الهدف الاساسي لهذه الدراسة هو تقييم اثر الرعاية الصيدلانية المقدمة من الصيدلاني السريري على المرضى في صيدليات المجتمع. كما و تهدف الى تقييم ردود فعل الاطباء و المرضى للتوصيات المقدمة من هذا الصيدلاني ٠

خلال هذه الدراسة تم توزيع حوالي ١٦٠ مريض عشوائيا الى مجموعتين، احداهما تم تقديم خدمات الصيدلاني السريري لها (٨٢ مريض) و الاخرى لم يتم تقديم هذه الخدمة لها (٧٨ مريض)٠ تمت متابعة المرضى لحوالي ٣.٣٩ شهر ٠

اجريت الدراسة في ٢ من صيدليات المجتمع، و تم الاتصال مع حوالي ٢٠ طبيب بواسطة صيدلاني سريري ٠

غالبية المرضى كانت لديهم مشاكل متعلقة بالعلاج بمعدل حوالي ٥ مشاكل لكل مريض يعاني من ما معدله ٣ امراض مزمنة ٠ اهم هذه المشاكل كانت متعلقة بعدم الالتزام بالعلاج، الحاجة لاضافة دواء، الحاجة لفحوصات اضافية و عدم المعرفه للعلاج ٠

حوالي ٦٧٪ من اقتراحات الصيدلاني السريري للمجموعة التي قدمت لها الخدمة تم تسليمها للطبيب، تم قبول حوالي ٩٤٪ من هذه الاقتراحات، ٧٤٪ من الاقتراحات المقبولة تم تطبيقها ٠

معظم المرضى كانوا في غاية الرضى من خدمات الصيدلاني السريري، و لم يكن اي منهم غير راضي عن هذه الخدمات